

# NASA TECH BRIEF

*Lyndon B. Johnson Space Center*



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

## Cryogenic Line Insulation Made From Prefabricated Polyurethane Shells

### The problem:

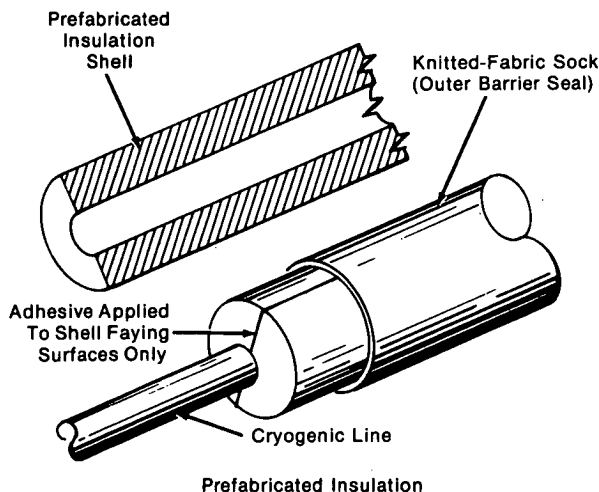
Cryogenic lines are usually insulated with either steel vacuum jackets or synthetic foams. The vacuum jackets are expensive and add extra weight to cryogenic systems. The synthetic foams, on the other hand, are difficult to work with because they have to be poured and machined to shape at the installation, often in cramped quarters.

### The solution:

Prefabricated polyurethane foam insulation is inexpensive and is easily installed on cryogenic lines.

### How it's done:

The insulation is formed by pouring polyurethane foam into epoxy/fiberglass molds. The molds are semicircular cylinder sections covered inside with light-gauge aluminum sheet. After a mold is filled, a tube section of the same diameter as the cryogenic line is placed into the foam to form the inner diameter. The excess foam is removed to the mold line by a sharp spatula. The foam is then left to cure.



The finished insulation sections are semicircular half shells (see figure). A pair of these half shells is placed to surround the cryogenic line. An adhesive bonding material is applied to the polyurethane faying surfaces to attach the half shells together. No adhesives are used on the shell surfaces in contact with the cryogenic lines. A cylindrically-shaped, knit Kevlar\* 29, or equivalent, sock is pulled over the insulation. The sock then is tapered at the ends and is covered with polyurethane resin to seal the system.

\*Trademark of E.I. du Pont de Nemours and Company, Wilmington, Delaware 19898

### Note:

Requests for further information may be directed to:

Technology Utilization Officer  
Johnson Space Center  
Code AT3  
Houston, Texas 77058  
Reference: TSP75-10110

### Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

Patent Counsel  
Johnson Space Center  
Code AM  
Houston, Texas 77058

Source: G. Lerma of  
Rockwell International Corp.  
under contract to  
Johnson Space Center  
(MSC-19523)

Categories: 06 (Mechanics)  
08 (Fabrication Technology)  
04 (Materials)

